

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal procedures.

1.2 REFERENCES

- .1 American Association of State Highway and Transportation Officials (AASHTO).
 - .1 AASHTO M180, Corrugated Sheet Steel Beams for Highway Guardrails.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.
- .3 Canadian Standards Association (CSA).
 - .1 CAN/CSA-080 Series, Wood Preservation.
 - .2 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 SCOPE

This specification covers the requirements for the supply and installation of guide rail installation types together with the accompanying posts.

1.4 SUBMITTALS

- .1 Inform Departmental Representative at least 4 weeks prior to beginning work, of proposed sources of guide rail and components.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle materials.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
- .4 Unused paint or coating material must be disposed of at an official hazardous material collections site as approved by Departmental Representative.
- .5 Fold up metal banding, flatten and place in designated area for recycling.
- .6 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in any other location where it will pose a health or environmental hazard.

- .7 Do not dispose of preservative treated wood through incineration.
- .8 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.
- .9 Dispose of treated wood, end pieces, wood scraps and sawdust at a sanitary landfill.
- .10 Dispose of unused preservative material at an official hazardous material collections site. Do not dispose of unused preservative material into the sewer system, streams, lakes, on ground or in any other location where they will pose a health or environmental hazard.

1.6 ENVIRONMENTAL REQUIREMENTS

- .1 Guide rail posts located in Protected Water Supply areas shall only be chromated copper arsenate (CCA) treated type.

1.7 MEASUREMENT FOR PAYMENT

- .1 Guide Rail: Measure supply and installation of steel W-beam guide rails including posts and necessary hardware in linear metres (LM) of guide rail installed and measured from outer terminal ends of steel W-beam guide rail. Include the cost of all plant, labour, equipment and materials required to complete work as specified on project drawings.

PART 2 PROUDCTS

2.1 MATERIALS

- .1 Guide rail parts furnished under these specifications shall be interchangeable with similar parts, regardless of their source of manufacture.
- .2 Rail Sections
 - .1 The rail elements shall consist of a corrugated steel W-beam with corrugations symmetrical about the horizontal axis and such that the edges and centre of the rail element may contact each post.
 - .2 The individual rail elements shall be of the Standard Type (W-beam) consisting of 2.75 mm thick (12 gauge) rail of length not less than 4125 mm, having post bolts slots 3810 mm apart centre to centre; unless indicated elsewhere on a drawing or supplementary general condition in which case one additional post bolt slot will be placed at mid-span.
 - .3 The rail metal shall be open hearth oxygen furnace or electric furnace steel having an elongation of not less than 12 per cent in 50 mm and shall withstand a cold bend, without cracking, of 180° around a mandrel of a diameter equal to 2 ½ times the thickness of the plate.

- .4 The rail elements shall be hot-dip galvanized before or after fabrication. In accordance with the specifications of ASTM Designation A-515 (Class 2 ½ oz) or A123.
 - .5 Rail element joints shall be capable of withstanding a tensile load of not less than 350 kN without failure. The rail element shall not deflect more than 140 mm when tested as a simple beam with the traffic face up and with an 8.9 kN load applied at the centre of a 3650 mm span through a 76 mm wide flat bearing.
 - .6 Workmanship shall be equivalent to good commercial practice and all edges, bolt holes and surfaces shall be free of torn metal, burns, sharp edges and protrusions.
 - .7 Rail sections shall be supplied by the contractor.
 - .8 Two certified copies of mill test reports of each batch from which the rail element is formed, shall be furnished to the Departmental Representative, if so required.
- .3 Rail terminal sections shall be of the standard type, as illustrated on the drawings. The metal and galvanizing shall be of the same thickness and quality as is stipulated for the rail sections.
- .4 Bolts, Nuts, Washers and Spikes
- .1 All bolts, nuts and washers shall conform to the specifications of ASTM Designation A-307 or A-325, except that rail splice bolts shall be button headed.
 - .2 Post bolts and splice bolts shall have shoulders of such shape and size that they fit into the bolt slots in the rails and thus prevent the bolt from turning.
 - .3 Post bolts shall be 16 mm diameter and 200 mm long for use with standard 150 mm x 150 mm posts, or 16 mm diameter and 250 mm long for use with 200 mm x 200 mm posts.
 - .4 Post bolt washers for the back of posts shall be 45 mm in diameter and 4 mm thick.
 - .5 Bolts for anchors shall be 16 mm diameter and 250 mm long for use with standard 150 mm x 150 mm posts and anchors, or 16 mm diameter and 450 mm long for use with 200 mm x 200 mm posts and anchors. Washers shall be 45 mm round and 4 mm thick.
 - .6 Spikes for anchors shall be 125 mm galvanized spikes.
 - .7 Bolts, nuts, washers and other fittings shall be hot-dip galvanized in accordance with the specification of ASTM Designation A-153.
 - .8 The Contractor shall supply the bolts, nuts, washers and spikes.

- .5 Silver signal reflectors and yellow signal reflectors shall be of size 75 mm x 100 mm.
- .6 Nails for securing signal reflectors, shall be supplied by the Contractor and shall consist of 30 mm galvanized flat head nails.
- .7 Posts and Anchors
 - .1 Timber for posts and anchors shall be sound, well seasoned structural grade lumber. Only birch wood will be acceptable for 150 x 150 guide rail posts. Hemlock or other approved species will be acceptable for 200 x 200 guide rail posts.
 - .2 Posts shall have minimum dimensions of 200 mm x 200 mm x 2400 mm,
 - .3 Anchors shall consist of either one piece of guide rail post cut 450 mm long, or two pieces of 38 mm x 140 mm x 450 mm lumber.
 - .4 Posts and anchors shall be pressure treated as per Section 06 05 73.

PART 3 **EXECUTION**

3.1 **INSTALLATION**

- 1. Galvanized materials shall be loaded, hauled and handled in such manner that galvanizing will not be damaged. All bare, abraded, and damaged surfaces shall be cleaned, pre-treated if required and coated with cold galvanizing compound as outlined above.
- .2 Guide rail shall be placed to the lengths, lines and grades set by the Departmental Representative. Except where directed otherwise by the Departmental Representative, the guide rail shall be installed in accordance with the requirement of the drawings.
- .3 Where a 150 mm x 1450 mm x 450 mm timber anchor is used, it shall be secured to the post by means of a galvanized nut and 16 mm diameter bolt 350 mm long together with two 45 mm round 4 mm thick galvanized washers.
- .4 Where a double 38 mm x 140 mm x 450 mm lumber anchor is used, it shall be secured to the post by means of four 125 mm galvanized spikes.
- .5 Field boring and cutting to length of anchors will be permitted, provided that the hole is treated with two coats of wood preservative before driving the bolts and provided that the cut end is treated with two coats of wood preservative before burying.
- .6 The Contractor shall excavate holes for the posts such that when placed in the holes the bottom of the posts are at least 1200 mm below the ground surface.
- .7 Posts shall be set plumb and to the established lines and grades and shall be placed at 3810 mm intervals, unless directed by the Departmental Representative
- .8 The posts shall be firmly backfilled with selected material, free of large rock, placed in layers of thickness not greater than 100 mm. Each layer shall be thoroughly compacted

before the next layer is placed. Should the backfill be dry then each layer shall be moistened before tamping.

- .9 All backfill shall be compacted to 95% of Standard Proctor Density (ASTM D698).
- .10 All surplus excavated material shall be disposed of along the sides of fill, or in other locations as directed by the Departmental Representative.
- .11 The rails shall be secured to even lines such that the centre of the rail is 500 mm above the edge of pavement.
- .12 The Contractor shall bore holes in the posts for the post bolts and treat the holes with two coats of wood preservative before driving the bolts.
- .13 When the attachment of the rail elements to the posts has been completed, the tops of the posts shall be cut to a point 75 mm above the top of the rail. The tops of the posts shall be treated with two coats of wood preservative after cutting.
- .14 Signal reflectors shall be attached to posts at terminal sections, posts at the buried end sections, and to every fourth post in a length of guide rail. Silver reflectors shall be placed facing oncoming traffic and yellow reflectors shall be placed on the opposite side of the post except for divided highway
- .15 The Contractor shall drill nail holes in the reflectors, bend the reflectors to the required shape and secure the reflectors with 30 mm galvanized flat head nails.

3.2 TOUCH-UP PAINTING

- .1 Galvanized steel touch up:
 - .1 Clean damaged surfaces with wire brush removing loose and cracked coatings. Apply two coats of organic zinc-rich paint to damaged areas. Pre-treat damaged surfaces according to manufacturer's instructions for zinc-rich paint.

END OF SECTION